Claims

What is claimed is:

1. A method comprising:

configuring a device virtual machine (VM) to emulate a hardware device, wherein the device VM includes device emulation code used to emulate the hardware device.

2. The method of claim 1, wherein the device VM is created dynamically.

3. The method of claim 2, wherein the device VM is created dynamically by a virtual machine monitor (VMM) in response to a request for a device needed to provision a new client VM being created.

4. The method of claim 1, wherein a virtual machine monitor (VMM) uses the device VM as the emulated hardware device.

5. The method of claim 1, wherein a virtual machine monitor (VMM) allocates the device VM to a client VM.

6. The method of claim 1, wherein a client virtual machine (VM) uses the device VM as the emulated hardware device.

7. The method of claim 1, wherein a virtual machine monitor (VMM) allocates the device VM to an operating system (OS) hosting the VMM.

8. The method of claim 1, wherein an operating system (OS) hosting a virtual machine monitor (VMM) uses the device VM to emulate the hardware device.

9. The method of claim 1, wherein the device VM is used to emulate one or more homogeneous hardware devices.

10. The method of claim 1, wherein the device VM is used to emulate one or more heterogeneous hardware devices.

11. The method of claim 1, wherein configuring the device VM to emulate the hardware device comprises:

determining which resources are needed to emulate the hardware device;

if the determined resources include a hardware resource, sending a request to a virtual machine monitor (VMM) to allocate the hardware resource for the device VM; and

configuring the allocated hardware resource to run the device emulation code.

12. The method of claim 11, wherein the device VM and the VMM communicate via shared memory.

13. The method of claim 11, wherein the device VM and a client VM communicate via shared memory.

14. The method of claim 11, wherein the device VM and a client VM communicate via message passing.

15. The method of claim 11, wherein the hardware resource is an allocated processor execution thread.

16. The method of claim 11, wherein the hardware resource is an allocated processor core.

17. The method of claim 11, wherein the hardware resource is an allocated processor.

18. The method of claim 17, wherein the processor is one of a logical processor, a processor core and a stand-alone processor.

19. The method of claim 11, wherein the hardware resource is emulated using special purpose microcode.

20. The method of claim 11, wherein the hardware resource is emulated using firmware.

21. The method of claim 11, wherein the hardware resource is a special-purpose instruction set extension.

22. The method of claim 11, wherein the hardware resource is emulated using a reconfigurable hardware block.

23. The method of claim 11, wherein the device VM and the VMM communicate via message passing.

24. A system comprising:

a device virtual machine (VM) configured to emulate a hardware device, wherein the device VM includes device emulation code used to emulate the hardware device.

25. The system of claim 24, wherein the device VM is created dynamically.

26. The system of claim 25, wherein the device VM is created dynamically by a virtual machine monitor (VMM) in response to a request for a device needed to provision a new client VM being created.

27. The system of claim 24, further comprising a virtual machine monitor (VMM) that uses the device VM as the emulated hardware device.

28. The system of claim 24, further comprising a virtual machine monitor (VMM) that allocates the device VM to a client VM.

29. The system of claim 24, further comprising a client virtual machine (VM) that uses the device VM as the emulated hardware device.

30. The system of claim 24, further comprising a virtual machine monitor (VMM) that allocates the device VM to an operating system (OS) hosting the VMM.

31. The system of claim 24, further comprising an operating system (OS) that hosts a virtual machine monitor (VMM) that uses the device VM to emulate the hardware device.

32. The system of claim 24, wherein the device VM is used to emulate one or more homogeneous hardware devices.

33. The system of claim 24, wherein the device VM is used to emulate one or more heterogeneous hardware devices.

34. A machine-readable medium containing instructions which, when executed by a processing system, cause the processing system to perform a method, the method comprising:

configuring a device virtual machine (VM) to emulate a hardware device, wherein the device VM includes device emulation code used to emulate the hardware device.

35. The machine-readable medium of claim 34, wherein configuring the device VM to emulate the hardware device comprises:

determining which resources are needed to emulate the hardware device;

if the determined resources include a hardware resource, sending a request to a virtual machine monitor (VMM) to allocate the hardware resource for the device VM; and

configuring the allocated hardware resource to run the device emulation code.

36. An apparatus comprising:

a device virtual machine (VM) configured to emulate a hardware device, wherein the device VM includes device emulation code used to emulate the hardware device.

37. The apparatus of claim 36, wherein the device VM is created dynamically.

38. The apparatus of claim 37, wherein the device VM is created dynamically by a virtual machine monitor (VMM) in response to a request for a device needed to provision a new client VM being created.

39. The apparatus of claim 36, wherein the device VM is used to emulate one or more homogeneous hardware devices.

40. The apparatus of claim 36, wherein the device VM is used to emulate one or more heterogeneous hardware devices.